

The Oasis

Vol. II, No. 21.

ARIZOLA, ARIZONA, THURSDAY, MARCH 29, 1894.

Whole No. 47.

ARIZONA'S ADVANTAGES.

Irrigation by Steam.

HOME SUPPLY OF FUEL.

Pumps as Crop Insurance. Facts from a Veteran Pumper's Experience.

Fourth Paper.

To the Editor of THE OASIS:

DEAR SIR:—In previous communications I have shown at some length that in the vicinity of Arizola are vast areas of free government land, to be had under the homestead or desert land laws (THE OASIS of September 28, 1893); that much of this land is under existing or prospective canal systems; that much more of it is provided with ample subterranean water supply from the sinking at the upper end of the Casa Grande Valley of the waters from the water shed of the Santa Cruz and Pantano districts, into the porous soil, and its consequent preservation, forming a vast subterranean reservoir in the lower valley about Arizola; and that these subterranean waters are available by their relative nearness to the surface. Facts were given showing the power to be derived from windmills, due to large wind movements; windmills to be supplemented by horsepowers or reliable vapor engines for small areas, in connection with triple plunger pumps of steady flow (THE OASIS of October 26, '93 and November 30 '93); economy and efficiency were shown to be practicable to men of small means wishing to pump their own water for small tracts, using only wind engines, horsepowers or vapor engines.

PUMPING BY STEAM.

For large areas these appliances, by duplication of devices used on small tracts, would be equally practicable, but it is well to see other ways of supplying water, and I propose to show what has been and may be done with steam and shall quote facts from the experience of a pioneer pumper in that line. Some four years ago Mr. Wm. A. Hartt of Tucson, with the courage of his convictions, started in to prove that water could be pumped from depths of from fifty to sixty feet, to profitably irrigate land in the upper Santa Cruz valley, about eighteen miles above Tucson. The flow even there is subterranean except in the rainy season, the ground is thickly covered with mesquite of some size, and the rainfall there is about twelve inches but not seasonable, and must be largely supplemented by irrigation. The history of his experiments with different kinds of pumps—Pulsometer, Nye-Greely and other styles—would be very interesting but inappropriate here in detail. The result of years of patient and expensive tests proved to his satisfaction that economy and efficiency in steam pumping for large areas was to be found in the highest degree by using duplex compound pumps with condensers. The steam works expansively, first in the high pressure cylinders and then by exhaust into the opposite low pressure cylinders, high and low pressure cylinders being tandem on the cylinder, condensers returning hot water to the boiler and saving valuable fuel.

MR. HARTT SAYS

"My pump was built by the Smith & Vail Co. of Dayton, Ohio. It has a full capacity of 2500 gallons per minute (500,000 gallons per hour) and I

have had it in use for nearly three years. My ranch consists of 2080 acres or three and one-quarter sections of land. My actual running expenses are \$3.50 per day while the pump is in use, viz: one cord of mesquite, \$2; fireman, \$1; oil, 50c. I am not farming my whole place, but so far as I have my expense for putting the water in the ditch for the three years has averaged about \$1.50 per acre per year. This means water for two crops, and crops requiring much water and flooding, such as barley, wheat, peanuts, etc.; not trees and vines.

"My plant is in operation not more than three months in the year.

PUMPING AS AN INSURANCE.

"Most people have a mistaken idea in regard to irrigation by pumping. The popular opinion is that the pump does all the work, when the fact is the rain does most of the work. [N. B. This does not apply to Arizola, with four inches only of rainfall annually.—R. B. B.] and the pump is more of an insurance wherein if danger threatens you pay the premium by pumping, and are sure of your crop. When my crops want water they get it within two hours, which is a great advantage over waiting on a ditch company or taking half allowance. If I had water rights under a ditch today I would not be without a pump as an insurance, provided I had a supply of water to pump from. The additional crop obtained soon pays for the plant."

EFFICIENCY OF FUEL.

To the district about Arizola fuel is an important item in pumping by steam, since it is scarce and consequently expensive, and the immediate supply would be soon exhausted. With the discovery of coal in Sonora, Mexico and Southern Arizona, and with the completion of the Prescott & Phoenix railroad, bringing the coal of Northern Arizona within easy reach, the fuel problem would be simplified. In a letter of Mr. Hartt's to the citizens of Wilcox, Arizona, as to the cost of producing water, &c., he says: "In actual every day service, as demonstrated on my ranch, a cord of well seasoned wood (mesquite) weighing about 4500 pounds, will operate my plant for ten hours, producing 2,000 gallons of water per minute (120,000 gallons per hour) at an elevation from below of sixty (60) feet, or 1,200,000 gallons per day. * * * enough to cover fifteen (15) acres three (3) inches deep. If, as some authorities claim, an 'acre foot' (or the amount of water necessary to cover an acre one foot deep) properly applied without loss, (and land properly cultivated) will irrigate an acre one year, then a cord of mesquite wood (or its equivalent, a ton of soft coal) will pump enough water to irrigate 33 acres for a year. A great deal depends upon the kind of soil, annual rainfall, the crop and the care in using whether such a volume of water will do more or less service. A California 'miner's inch' amounts to a continuous flow of about nine gallons per minute, and by the above figures it will be seen that a cord of mesquite (or ton of coal) will maintain a continuous flow of one miner's inch for over ninety-two days of twenty-four hours, besides raising it sixty feet high.

"A water right in California fruit districts usually consists of one-tenth (1-10) of a miner's inch per acre; so a cord of wood will irrigate ten acres

MARCH CLIMATE AT ARIZOLA.

WEATHER REPORT

For Week Ending Wednesday, March 28, 1894.

As recorded by the Voluntary Observer of the United States Weather Bureau at this point:

Day.	7 A.M.	3 P.M.	9 P.M.	Mean	24 H.
Thursday	40.0	65.0	45.0	47.7	0
Friday	47.5	72.8	55.5	56.8	0
Saturday	49.5	73.4	60.0	60.7	10
Sunday	50.0	79.5	59.4	62.7	0
Monday	52.2	82.0	59.0	63.0	0
Tuesday	50.0	88.5	59.5	65.2	9
Wednesday	67.5	90.0	67.3	73.2	10

An entirely clear sky is denoted by a cipher and numerals denote tenths of total obscuration by clouds.

ninety-two days. * * * Few people realize the enormous energy stored in a cord of wood. * * * Wood costs me \$2.00 per cord at the furnace door, attendance \$2.50 per ten hours, oil, &c 25c., repair fund 25c., interest on plant 50c., giving totals as follows:

"Cost of producing an acre foot of water, \$1.48

"Cost of producing California water for one acre, one year \$2.20

"Pumping continuously my plant would furnish in a year 140,160,000 cubic FEET of water, or cover 3,218 acres one foot deep. But let us be liberal, and taking all crops allow two (2) feet of water per acre, equal to one and one-half water rights, and the plant would irrigate liberally 1609 acres. Assuming that an average "water right" costs \$15.00 per acre, on the 1609 acres we have a fund of \$24,135.00 with which to build a plant, which is your water right and canal company, all on your own ground and at your own orders.

COST OF PLANT.

"A duplicate of my plant consisting of one (1) duplex compound pumping engine with condenser, one (1) 45 H. P. steel boiler with all fittings and connections, suction and discharge pipes, boiler house (frame), well (24x12 and sixty feet deep, timbered with 6x8 redwood and two inch planking, in four compartments), ditches to every legal subdivision, everything ready to operate, can be put in shape for \$9,500."

GROWING FUEL.

To a resident in the north or east, accustomed to the slow growth of trees, the idea of growing one's own fuel would seem preposterous, but to those who have seen the extraordinary annual growths made by such trees as the cottonwood, eucalyptus, poplar and other well known rapid growers, in the long season, warm climate and abundant sunshine of Arizona, when well supplied with water, the idea has nothing startling about it. On this subject Mr. Hartt says: "Good wood at \$2 per cord is cheap fuel, and there is no reason why a man who is irrigating should ever pay more after the first year or two. A live line fence can be planted of any quick growing wood, suitable for fuel. * * * By cutting off one-half the fence every other winter you will get from one to three good sized cordwood sticks from every shoot. The trees will only save water that would otherwise evaporate and be lost, and serve as windbreaks, objects of beauty and shade."

CROPS AND PROFITS.

The results of any enterprise are often more convincing than the most perfect theory, and it may interest people of the irrigated regions to know something of Mr. Hartt's meth-

ods and success. In a letter from his ranche, eighteen miles above Tucson, of date December 6, 1892, which he wrote to my brother, he says: "I raise two crops on all the land I plant, viz: from November to May, hay (wheat or barley), average about 24 tons per acre—have never sold any at less than \$20 per ton; the ground lies idle until the first of July, and then I plant beans, harvesting in October, from 1500 to 2000 lbs per acre—never have sold a bean less than \$80 per ton, and many at five to six cents a pound; plant again in November to hay, and then in June to corn, getting as much as eighty bushels per acre—never sold corn for less than two cents per pound. All produce is worth about double here what it is at Phoenix, as freight is over \$8.00 per ton, and Tucson does not produce one-fourth of what she consumes. Hay is worth at harvest here \$8.00 to \$10.00 per ton, and six months later \$20 to \$25. Mexicans sell as soon as they can, and as soon as that is consumed those who hold get double or more. I sold all my hay in a block last year at \$20 per ton. I can depend upon clearing \$50.00 per acre from the land I cultivate, and can make more in proportion out of a small piece, for the minute you extend beyond what you can personally oversee, your profits begin to decrease, as Mexican labor cannot be depended on."

ADVICE FOR LARGE OWNERS.

"If you purchase a large piece of land do not attempt to farm it through an agent in the towns, but if you insist on making it pay from the start by raising annual crops, put a responsible (married) man on it and furnish him with say two Mexicans, and let him handle what he can conveniently and well, and work with the men himself. Keep this force the year round, and when they are not busy with crops put them to planting trees and vines to improve the balance of the land. Grain land will never go high; orchards always into the hundreds, and perhaps into the thousands per acre; in three years your vines will bring you double the profit of your grain lands, besides increasing their value three or four hundred per cent."

In conclusion it must be borne in mind that Mr. Hartt is a man of great energy and great resource in emergency, and thinks and acts prudently and has abundant capital. He sold his place above Tucson for \$100,000 in cash, still retaining a one-sixth interest, and is now engaged with General J. B. Weaver (the populist candidate for president) in carrying out the same plan of pumping for irrigation in the upper valley, about thirty-five miles above Arizola. In view of his results, pumping pays, and doubtless Arizola will yet see it carried to great areas within her territory and tributary to her merchants.

R. B. BRYAN.

MARCH 1st, 1894.

It has been a queer year in some respects. Oats have sold for as much as wheat, pound for pound, and apples for more than oranges, peck for peck. All winter hogs have been worth more alive than dead, although there is no interest to compete with pork packers. Middlings and feed have sold for more than wheat, and a dozen other trade anomalies have been witnessed. There seems to be a twist in things generally.